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09/924,205	08/07/2001	Harlan A. Talley	10006809-2	1100

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EXAMINER	
HUNG, YUBIN	

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/924,205	TALLEY ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 07 August 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference character(s) mentioned in the description: 100, 102, 104 and 106. (See P. 2, Paragraph 0007, lines 7-9 of the specification.) Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84l) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections – 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 8, 14-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. In claim 8, "YCaCb" (line 2) is a color space not well known in the art (while YCbCr is). No definition of this color space is provided in the specification. The same applies to claims 14-19.

5. For examination purpose, hereinafter YCaCb will be interpreted as YCbCr.

Claim Rejections – 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Sugiura et al. (US 5,465,164).

8. Regarding claim 1, Sugiura discloses

- performing an inverse DCT upon data using processor executable instructions to generate a first result in a first color space [Fig. 1, numerals 116, 117; Col. 2, lines 56-62]
- performing a conversion upon the first result using conversion hardware to generate a second result in a second color space [Fig. 1, numeral 117; Col. 2, lines 56-62]

Claim Rejections – 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164) as applied to claim 1 above, further in view of Greene (US 6,043,804).

11. Regarding claim 2, Sugiura discloses all limitations of its parent, claim 1.

Sugiura does not expressly disclose

- performing the conversion includes performing a matrix multiplication for a color space conversion from the first color space to the second color space

However, in [Fig. 3b, numeral 108; Fig. 4a; Col. 4, lines 31-54; Col. 5, lines 48-51] Greene teaches converting from one color space to another using matrix multiplication.

Sugiura and Greene are combinable because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Sugiura with the teachings of Greene by using matrix multiplication. The motivation would have been that the matrix defines the relationship between the two color space representations and lends itself to efficient implementation.

Therefore, it would have been obvious to combine Greene with Sugiura to obtain the invention specified in claim 2.

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12. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164) and Greene (US 6,043,804) as applied to claim 2 above, further in view of Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193)

13. Regarding claim 3, Sugiura and Greene disclose all limitations of its parent, claim 2.

Sugiura and Greene do not expressly disclose

- performing the inverse DCT includes using a Winograd process

However, in Sect. V (pp. 2185-2186) Winograd teaches the Winograd process.

The combined invention of Sugiura and Greene is combinable with Winograd because they both have aspects that are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Sugiura and Greene with the teachings of Winograd by using the Winograd process. The motivation would have been that the Winograd process is well known to be a fast algorithm for computing inverse DCT.

Therefore, it would have been obvious to combine Winograd with Sugiura and Greene to obtain the invention specified in claim 3.

14. Regarding claim 4, it is inherent that both the first and the second results (YUV and RGB in Greene) have their respective formats.

15. Regarding claim 5, it is well known in the art that floating point format affords higher data precision and the results of IDCT, if not rounded or truncated, are floating point values. Since the matrix for the color space conversion contains floating-point coefficients [Greene, Fig. 4a], it would have been obvious to one of ordinary skill in the

art to keep the first format (i.e., the format of the outputs of the IDCT) floating points. Regarding the second format (i.e., the format for the RGB color space [Sugiura, Fig. 1, numeral 117]), it is well known in the art that they are represented as non-negative integers. And therefore it is also obvious to one of ordinary skill in the art to use this format.

16. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164), Greene (US 6,043,804) and Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) as applied to claim 5 above, further in view of Bhaskaran et al. (US 5,467,131).

17. Regarding claim 6, the combined invention of Sugiura, Greene and Winograd (SGW) discloses all limitations of its parent, claim 5 and Greene further discloses

- the second plurality of data elements each include 8 bits [Fig. 3b, the rightmost output. Note that B1/B2/B3 (i.e. R,G,B, which uses the second format) occupies 24 bits]

SGW does not expressly disclose

- the first plurality of data elements each include 16 bits

However, in Col. 8, lines19-22 Bhaskaran teaches using 16-bit arithmetic, which implies that the results of the operation (i.e., the elements such as Y, U and V that comprise each of the first results) have a format of 16 bits each.

SGW and Bhaskaran are combinable because they both have aspects that are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify SGW with the teachings of Bhaskaran by using 16 bits for each of the first plurality of data elements . The motivation would have been that the underlying hardware architecture could be taken advantage of to improve efficiency [Bhaskaran, Col. 8, lines 23-28] .

Therefore, it would have been obvious to combine Bhaskaran with SGW to obtain the invention specified in claim 6.

18. Regarding claim 7, the combined invention of Sugiura, Greene, Winograd and Bhaskaran [SGWB] disclose all limitations of its parent, claim 6.

SGWB does not expressly disclose

- the fractional portion of the first plurality of data elements includes 5 bits; and the integer portion of the first plurality of data elements includes 8 bits

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify SGW by using 5 bits and 8 bits for the fractional and the integer portions, respectively, of the first plurality of data elements. Applicant has not

disclosed that using the 5/8 breakdown provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with using a 6/7 breakdown because in some situations (e.g., in a low-light environment) the, say, Y, U, V components may each have a value no more than 7-bit in size.

Therefore, it would have been obvious to one of ordinary skill in this art to modify SGWB to obtain the invention as specified in claim 7.

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19. Claim 8 **(as interpreted)** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164), Greene (US 6,043,804), Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193), and Bhaskaran et al. (US 5,467,131) as applied to claims 6 and 7 above, further in view of Karakawa (US 6,304,237).

Regarding claim 8, the combined invention of Sugiura, Greene, Winograd and Bhaskaran (SGWB) discloses all limitations of its parent, claim 7.

SGWB does not expressly disclose

- the first color space includes a YCbCr color space and the second color space includes a RGB color space

However, in [Fig. 5; Col. 6, lines 18-23] Karakawa teaches having the first color space include an YCbCr color space and the second color space include a RGB color space.

SGWB and Karakawa are combinable because they both have aspects that are from the same field of endeavor of color conversion.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify SGWB with the teachings of Karakawa by using YCbCr as the input and RGB as the output color spaces, respectively. The motivation would have been that, with the increased popularity of digital HD TVs, YCbCr is also gaining importance since it is a digital color space for television transmission, .

Therefore, it would have been obvious to combine Karakawa with SGWB to obtain the invention specified in claim 8.

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20. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,587,590) and Sugiura et al. (US 5,465,164).

Regarding claim 9, Sugiura discloses.

- a color space converter configured to perform a color space conversion on the reformatted data
  [Fig. 1, numeral 117; Col. 2, lines 56-62]

Sugiura does not expressly disclose

- a formatting device arranged to receive decompressed data generated from the execution of processor executable instructions and configured to generate reformatted data from the decompressed data

However, in [Fig. 20, numeral 1730; Col. 58, lines 31-47] Pan discloses a formatting device that clips decompressed data. (Note that the input to 1730 are decompressed outputs before clipping.]

Sugiura and Pan are combinable because they are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Sugiura with the teachings of Pan. The motivation would have been to prepare the data in a format that is appropriate for the attached output device (e.g., 8 bits per channel for the RGB color space that is commonly used for CRT displays).

Therefore, it would have been obvious to combine Pan with Sugiura to obtain the invention specified in claim 9.

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21. Claim 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164) and Pan (US 6,587,590) as applied to claim 9 above, further in view of Greene (US 6,043,804).

22. Regarding claim 10, Sugiura and Pan disclose all limitations of its parent, claim 9.

Sugiura and Pan do not expressly disclose

- the color space converter includes a configuration to perform the color space conversion using a matrix multiplication

However, in [Fig. 3b, numeral 108; Fig. 4a; Col. 4, lines 31-54; Col. 5, lines 48-51] Greene teaches converting from one color space to another using matrix multiplication.

The combined invention of Sugiura and Pan is combinable with Greene because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Sugiura and Pan with the teachings of Greene by using matrix multiplication. The motivation would have been that the matrix defines the relationship between the two color space representations and lends itself to efficient implementation.

Therefore, it would have been obvious to combine Greene with Sugiura and Pan to obtain the invention specified in claim 10.

23. Regarding claim 11, Pan further discloses

- the decompressed data includes a first plurality of data elements having an integer portion and a fractional portion
[Col. 42, lines 14-15]

- the reformatted data includes a second plurality of data elements and the formatting device includes a configuration to generate the second plurality of data elements having an integer portion [Fig. 20, numeral 1730 (the one on the left); Col. 42, lines 16-17; Col. 58, lines 44-46]

24. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164), Pan (US 6,587,590) and Greene (US 6,043,804) as applied to claims 10-11 above, further in view of Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193)

25. Regarding claim 12, the combined invention of Sugiura, Pan and Greene (SPG) disclose all limitations of its parent, claim 11.

SPG does not expressly disclose

- the computer executable instructions include a configuration to generate the decompressed data by performing an inverse DCT using a Winograd process

However, in Sect. V (pp. 2185-2186) Winograd teaches the Winograd process.

The combined invention of SPG is combinable with Winograd because they both have aspects that are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify SPG with the teachings of Winograd by using the Winograd process. The

motivation would have been that the Winograd process is well known to be a fast algorithm for computing inverse DCT.

Therefore, it would have been obvious to combine Winograd with Sugiura, Pan and Greene to obtain the invention specified in claim 12.

26. Regarding claim 13, the combined invention of Sugiura, Pan, Greene and Winograd [SPGW] disclose all limitations of its parent, claim 12.

SGWB does not expressly disclose

- each of the first plurality of data elements includes 16 bits
- each of the second plurality of data elements includes 8 bits

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify SPGW by using 16 bits and 8 bits for the first and the second sets of data elements, respectively. Applicant has not disclosed that using the 16 bits and 8 bits provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with using a 64 bits and 9 bits [Pan: Col. 42, lines 13-16] because of the underlying hardware architecture.

Therefore, it would have been obvious to one of ordinary skill in this art to modify SPGW to obtain the invention as specified in claim 13.

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27. Claims 14 and 15 **(both as interpreted)** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164) , Pan (US 6,587,590), Greene (US 6,043,804) and Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) as applied to claims 12-13 above, further in view of Karakawa (US 6,304,237).

28. Regarding claims 14, the combined invention of Sugiura, Pan, Greene and Winograd (SPGW) discloses all limitations of its parent, claim 13.

SPGW does not expressly disclose

- the reformatted data includes YCbCr color space data

However, in [Fig. 5; Col. 6, lines 18-23] Karakawa teaches having an input YCbCr color space that is converted into the RGB color space.

SPGW and Karakawa are combinable because they both have aspects that are from the same field of endeavor of color conversion.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify SPGW with the teachings of Karakawa by using YCbCr as the input and RGB as the output color spaces, respectively. The motivation would have been that, with the increased popularity of digital HD TVs, YCbCr is also gaining importance since it is a digital color space for television transmission,

Therefore, it would have been obvious to combine Karakawa with SPGW to obtain the invention specified in claim 14.

29. Regarding claim 15, Karakawa further discloses

- the color space converter includes a configuration to convert the reformatted data to RGB color space data
[Fig. 5; Col. 6, lines 18-23]

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30. Claim 16-18 **(all as interpreted)** and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,587,590), Karakawa (US 6,304,237) and Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) as applied to claims 12-13 above, further in view of Karakawa (US 6,304,237).

31. Regarding claim 16, and similarly claim 20, Pan discloses

- a processing device configured to execute instructions to compute an inverse DCT to generate decompressed YCbCr color space data in a first format
[Fig. 5, numeral 540; Col. 5, lines 55-67; Col. 6, lines 15-21]

- a converter configured to change the YCbCr color space data from the first format to a second format
[Fig. 20, numeral 1730; Col. 42, lines 14-17; Col. 58, lines 44-47]

Pan does not expressly disclose

- that the IDCT is computed using a Winograd process
- a color space converter configured to generate RGB color space data from the YCbCr color space data in the second format

However, in Sect. V (pp. 2185-2186) Winograd teaches using the Winograd process for IDCT and in [Fig. 5; Col. 6, lines 18-23] Karakawa teaches converting (format-converted) YCbCr color space data into RGB color space data.

Pan, Winograd and Karakawa are combinable because they both have aspects that are from the same field of endeavor of data conversion.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Pan with the teachings of Winograd and Karakawa by using the Winograd process for the IDCT computation and to convert YCbCr color space data into RGB color space data. The motivation would have been that the Winograd process is well known to be a fast algorithm for computing inverse DCT and that RGB is the most widely used color space for CRT displays.

Therefore, it would have been obvious to combine Winograd and Karakawa with Pan to obtain the invention specified in claim 16.

32. Regarding claim 17, Pan, Winograd and Karakawa do not expressly disclose

- the YCbCr color space data in the first format includes a first set of data elements each having 16 bits
- the YCbCr color space data in the second format includes a second set of data elements each having 8 bits

However, the same analysis for claim 13 is applied to reject claim 17.

33. Regarding claim 18, and similarly claim 21, Pan further discloses

- the first set of data elements each includes an integer portion and a fractional portion
  [Col. 42, lines 14-15]
- the second set of data elements each include an integer portion
  [Col. 42, lines 16-17]

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34. Claim 19 **(as interpreted)** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,587,590), Karakawa (US 6,304,237) and Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) as applied to claims 16-18 above, further in view of Greene (US 6,043,804).

35. Regarding claim 19, the combined invention of Pan, Karakawa and Winograd (PKW) discloses all limitations of its parent, claim 18.

PKW does not expressly disclose

- the color space converter includes a configuration to generate RGB color space data from the YCbCr color space data in the second format using a matrix multiplication

However, in [Fig. 3b, numeral 108; Fig. 4a; Col. 4, lines 31-54; Col. 5, lines 48-51] Greene teaches converting from one color space to another using matrix multiplication.

The combined invention of Sugiura and Pan is combinable with Greene because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify PKW with the teachings of Greene by using matrix multiplication. The motivation would have been that the matrix defines the relationship between the two color space representations and lends itself to efficient implementation.

Therefore, it would have been obvious to combine Greene with PKW to obtain the invention specified in claim 19.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung

Patent Examiner

July 9, 2004

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